

REMARKS

Claims 1-2, 4-5 and 7-11 are pending. No amendments to the claims are presented at this time. Rather, reconsideration of the application is requested in view of the remarks which follow.

Claim Rejections under 35 USC §103

Claims 1 and 2 stand rejected under 35 USC §103(a) over Ivers-Tiffée et al. (*Journal of the European Ceramic Society*, 2001, pp. 1805-1811) in view of Virkar et al. (US 5,543,239).

Claim 4 stands rejected under §103(a) over Ivers-Tiffée et al. in view of Virkar et al. and further in view of Herbstritt et al. (*Proceedings of the Fourth European Solid Oxide Fuel Cell Conference*, 10th – 14th July 2000, Lucerne, Switzerland, 2000, pp. 697-706 - hereinafter “Herbstritt 1”).

Claims 5, 8 and 11 stand rejected under 35 USC §103(a) over Ivers-Tiffée et al. in view of Virkar et al. as applied to claim 1, and further in view of Herbstritt et al. (*Electrochemical Society Proceedings*, Volume: 99-19, 1999, pp. 972-980 - hereinafter “Herbstritt 2”).

Claim 7 stands rejected under 35 USC §103(a) over Ivers-Tiffée et al. in view of Virkar et al. as applied to claim 1, and further in view of Chen et al. (US 6,645,656 B1)

Claim 9 stands rejected under 35 USC §103(a) over Ivers-Tiffée et al., Virkar et al., and Chen et al. as applied to claim 7, and further in view of Herbstritt 2.

Claim 10 stands rejected under 35 USC §103(a) over Ivers-Tiffée et al., in view of Herbstritt 2, Virkar et al. and Van Berkel et al. (US 2002/0031694 A1).

The various rejections are amply discussed in the Office Action. For the sake of brevity, the Office's position is not reiterated here and the rejections are discussed in combination.

Each of the rejections is traversed. The cited references, even in the noted combinations, do not teach or suggest the features of the invention in any manner sufficient to sustain the rejections.

The Office Action asserts that the high-temperature solid electrolyte fuel cell according to Applicant's claim 1 is allegedly obvious in view of the previously cited Ivers-Tiffée et al. reference, in combination with newly cited U.S. patent 5,543,239 to Virkar et al. The remaining references are applied relative to certain features recited in Applicant's dependent claims, e.g., Herbstritt 1 is asserted in relation to the content of electrolyte particle; Herbstritt 2 is asserted relative to particle size; Chen is asserted in relation to preferred active materials for SOFC; and Van Berkel is applied for method-related application steps.

The Examiner acknowledges that Ivers-Tiffée et al. do not disclose an electrolyte boundary layer as recited in present claim 1. However, the position is taken that such an electrolyte boundary layer is taught by Virkar et al.

Applicant respectfully disagrees.

Present claim 1 characterizes the electrolyte boundary layer not only in that it "is applied by an MOD-process", but also recites that the electrolyte boundary layer "has a thickness of 100 to 500 nm". The art cited, including Virkar et al., clearly do not disclose a high-temperature solid electrolyte fuel cell having an electrolyte boundary layer which is applied by an MOD-process and has a thickness of 100 to 500 nm.

The Office Action equates the "porous surface layer" (referred to in the Office Action as "porous electrolyte layer") described by Virkar et al. with the electrolyte boundary layer recited in present claim 1. Regarding the thickness of the porous surface layer, the

Examiner refers to column 3, lines 17 to 18, of Virkar et al. where it is stated that "the porous surface layer is between about 1 and 10,000 micron, preferably between about 1 and 2000 micron" thick. Since 1 micron (10^{-6} m) is equal to 1,000 nm (rather than 100 nm as the Examiner suggests), the thickness of the porous surface layer disclosed by Virkar et al. is **between about 1,000 and 10,000,000 nm**, preferably between about 1,000 and 2,000,000 nm. Thus, it is clear that the porous surface layer described by Virkar et al. is at least twice as thick as the electrolyte boundary layer recited in present claim 1.

Moreover, Figures 3, 4 and 5 referred to in Example 7 of Virkar et al. clearly show that the porous electrolyte layer is, in fact, much thicker than the lower limit of 1 micron (1,000 nm) recited in column 3 (see scale bars provided in these figures). The thickness of Virkar's porous electrolyte layer and the Applicant's electrolyte boundary layer are entirely different. Beyond that, given the teachings of Virkar et al., one would not even be motivated to explore a layer having the thickness claimed in the instant invention. Furthermore, the porous electrolyte layer of Virkar et al. is not applied by an MOD-process.

The structure and function of the electrolyte boundary layer recited in present claim 1 were explained in Applicant's response to the previous Office Action (see page 6, last paragraph, of the response filed on August 12, 2008). As previously stated, since the electrolyte boundary layer has a thickness of only 100 to 500 nm, it "reproduces" the structure formed by screen printing the electrolyte particles. Thus, because the thickness of the electrolyte boundary layer is much smaller than the size of the electrolyte particles, the porosity of the structure obtained by screen printing the electrolyte particles is fully maintained after these particles are covered with the thin electrolyte boundary layer. This concept is fundamentally different from the structure disclosed by Virkar et al., as illustrated in Figure 1D of that reference where the porous electrolyte layer is indicated by reference numerals 12A and 12B (see Virkar et al. at column 7, lines 9-17). The foregoing further rebuts any *prima facie* case of obviousness contended.

Clearly, the porous layer of Virkar et al. is not a thin layer of electrolyte material covering a porous structure of electrolyte particles as is a feature of present claim 1. Indeed, the porous electrolyte layer according to Virkar et al., apart from being much thicker than the electrolyte boundary layer recited in claim 1, is also qualitatively entirely different.

Therefore, even in combination, the teachings of Ivers-Tiffée et al. and Virkar et al. do not render the high-temperature solid electrolyte fuel cell recited in present claim 1 obvious. The deficiencies of Ivers-Tiffée et al. and Virkar et al. are not remedied by the other references cited. Thus, the subject-matter of the dependent claims as well as the process of present claim 10 also are non-obvious in view of the art cited. It follows then, that no one of the rejections can be sustained.

Each of the rejections is properly withdrawn. To properly determine a *prima facie* case of obviousness, the Examiner “must step backward in time and into the shoes worn by the hypothetical ‘person of ordinary skill in the art’ when the invention was unknown and just before it was made.” M.P.E.P § 2142. This is important as “impermissible hindsight must be avoided and the legal conclusion must be gleaned from the prior art.” *Id.* Four factual inquiries must be made: first, a determination of the scope and contents of the prior art; second, a determination of the differences between the prior art and the claims in issue; third, a determination of level of ordinary skill in the pertinent art; and fourth, an evaluation of evidence of secondary consideration. *Graham v. John Deere*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). Three criteria may be helpful in determining whether claimed subject matter is obvious under 103(a): first, if there is some suggestion or motivation to modify or combine the cited references; second, if there is a reasonable expectation of success; and third, if the prior art references teach or suggest all the claim limitations. *KSR Int’l Co. v. Teleflex, Inc.* No 04-1350 (U.S. Apr. 30, 2007).

The cited references, even in combination, fail to teach or suggest the features of the present invention. Even if one were to combine the teachings, the result still would not be Applicant's invention.

In view of the above remarks, Applicant believes the pending application is in condition for allowance.

FEE AUTHORIZATION

While no fees are believed to be due, the Commissioner is authorized to charge any fees associated with this submission to our Deposit Account, No. 04-1105, Reference 62163(45107). Any overpayment should be credited to said Deposit Account.

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Respectfully submitted,

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